

AF/2853
Serial No. 09/089,698
Docket No. LE9-97-123
(51832.00/4665.0)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant: Benjamin A. Askren, et al.
Serial No.: 09/089,698
Filed: 06/03/1998
For: INK JET CARTRIDGE STRUCTURE
Examiner: M. Brooke
Group Art Unit: 2853

APPELLANTS' BRIEF ON APPEAL

Box: AF
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

This brief is filed in triplicate following the Notice of Appeal mailed on November 2, 2000. Our check no. 43278 in the amount of \$310 is enclosed.

REAL PARTY IN INTEREST

The real party in interest is Lexmark International, Inc., 740 New Circle Road, N.W., Lexington, Kentucky 40550.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

STATUS OF CLAIMS

Claims 1-22 and 25-39 are in the case and have been rejected four times. Claims 23-24 were cancelled. Claims 1-5 and 10-12 were rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 4,942,408 to Braun in view of U.S. Patent No. 5,066,964 to Fukuda et al. and U.S. Patent No. 4,296,421 to Hara et al. Claims 6 and 7 were rejected as being unpatentable over the '408 patent in view of the '964 patent and the '421 patent and further in view of U.S. Patent No. 5,426,458 to Wenzel et al. Claim 8 was

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rejected as being unpatentable over the '408 patent in view of the '964 patent and the '421 patent and further in view of U.S. Patent No. 5,079,189 to Drake et al. Claim 9 was rejected as being unpatentable over the '408 patent in view of the '964 patent and the '421 patent and further in view of U.S. Patent No.5,834,689 to Cook. Claim 13 was rejected as being unpatentable over the '408 patent in view of the '964 patent and the '421 patent and further in view of U.S. Patent No. 4,755,836 to Ta et al. Claims 14-18 were rejected as being unpatentable over the '408 patent, in view of the '964 patent, the '421 patent, the '836 to Ta et al. and U.S. Patent No. 5,278,584 to Keefe et al. Claims 19 and 20 were rejected as being unpatentable over the '408 patent, in view of the '964 patent, the '421 patent, the '836 patent, the '584 patent and further in view of the '458 patent. Claim 21 was rejected as being unpatentable over the '408 patent in view of the '964 patent, the '421 patent, the '836 patent, the '584 patent and further in view of the '189 patent. Claim 22 was rejected as being unpatentable over the '408 patent in view of the '964 patent, the '421 patent, the '836 patent, the '584 patent and further in view of the '689 patent. Claims 25-28 and 31 were rejected as being unpatentable over the '408 patent in view of the '964 patent, the '421 patent, the '836 patent and U.S. Patent No. 5,084,713 to Wong. Claims 29-30 were rejected as being unpatentable over the '408 patent in view of the '964 patent, the '421 patent, the '836 patent, and further in view of the '458 patent. Claims 32-35 and 38-39 were rejected as being unpatentable over the '408 patent in view of the '964 patent, the '421 patent and the '584 patent. Claims 36 and 37 were rejected as being unpatentable over the '408 patent in view of the '964 patent, the '421 patent and the '584 patent and further in view of the '458 patent.

Thus the claims on appeal as shown in the Appendix are independent Claim 1 and Claims 2-13 dependent therefrom; independent Claim 14 and Claims 15-22 dependent therefrom; independent Claim 25 and Claims 26-31 dependent therefrom; and independent Claim 32 and Claims 33-39 dependent therefrom.

STATUS OF AMENDMENTS

No amendments were filed subsequent to the Final Office Action on October 12, 2000. The Examiner stated in the Final Office Action dated December 12, 2000, that the arguments Appellants presented on September 20, 2000 have been fully considered but are not persuasive.

SUMMARY OF THE INVENTION

The invention set forth in the specification provides ink jet printhead structures, specifically substrate holders for effectively removing heat from a printhead and print cartridge in order to improve printer performance, operation and reliability. (Specification page 5, lines 9-11). The substrate holders have a top surface (12, Fig. 1A) having a perimeter, the top surface including one or more substrate locator wells (14, 16 and 18 Fig. 1A). (Specification page 4, lines 2-5). Each of the wells has a base (22 Fig. 1A) and at least one ink feed slot (24 Fig. 1A) disposed in the base of the wells. (Specification page 6, lines 24-25 and page 7, lines 16-20). The substrate holder also contains side walls (26, 28, 30 and 32 Fig. 1A) attached to the top surface along the perimeter thereof. (Specification page 4, lines 7-8). At least one of the side walls contains fins (34 Fig. 1A) for convectively removing heat from the substrate holder. (Specification page 4, lines 8-9). The substrate holder includes one or more chambers (36, 38 and 40 Fig. 1B) on an opposing side of the substrate holder from the substrate locator wells, each of the chambers being in flow communication with a corresponding substrate locator well. (Specification page 8, lines 3-7). Ink is provided from an ink supply source for feed of ink to the chambers. (Specification page 8, lines 10-11). In a preferred embodiment, the substrate holder is a machined, molded or cast, substantially metal structure. (Specification page 4, lines 26-28).

ISSUES

1. Would the subject matter of Claims 1-22 and 25-39 have been obvious to the person of ordinary skill at the time of the invention?

GROUPING OF CLAIMS

Appellants consider that the claims on appeal do not stand or fall together. Accordingly, for purposes of this appeal only, Appellants contend that the patentable subject matter of the application falls into three (3) groups as follows:

Group I consisting of Claims 1, 4-7, 12, 13, 17-20, 27-30 and 34-37 which define a substrate holder structure having a protective coating thereon.

Group II consisting of Claims 2-3, 8-9, 14-16, 21-22, 25-26, and 32-33 which define a preferred substrate holder structure made of a heat conducting material.

Group III consisting of Claims 10-11, 31, 38-39 directed to the substrate holder structure and ink reservoir body.

ARGUMENT

In the Final Office Action, Claims 1-22 and 25-39 were rejected as being obvious over a combination of references. As will be evident from the following discussion, the rejection is not well taken.

There is absolutely no motivation in the references to select and combine the specific elements from the references which are combined by the Examiner in order to provide Appellants' invention. The Examiner has merely engaged in hindsight reconstruction of Appellants' invention from the references using Appellants' disclosure as a guide without finding the requisite motivation in the references to make the combination.

The Rejection of Claims 1-22 and 25-39 Over the Combined References is in Error.

A. Claims 1-5 and 10-12 are Distinguished over the Cited References.

In the Final Office Action, Claims 1-5 and 10-12 were rejected over U.S. Patent No. 4,942,408 to Braun in view of U.S. Patent No. 5,066,964 to Fukuda et al. and U.S. Patent No. 4,296,421 to Hara et al. Claims 6-9, 13-22 and 25-39 were rejected over the '408, '964 and '421 patents in combination with one or more additional references.

The rejections are in error because there is no motivation in the references for making the modifications to the references which are required to obtain the claimed invention.

U.S. Patent No. 4,942,408 to Braun is directed to a print/cartridge structure including an ink reservoir housing having side wall, bottom walls and a cap assembly. The cap assembly includes a frame component which is sized to interfit around the top ends of the side walls of the reservoir. A fluid block component having a drop ejection chip mounted thereon is constructed to interfit with the inner periphery of a frame component or may be formed with the frame component as an integral capping part. In column 4, lines 35-41 of the '408 patent, it is suggested that a heat sink element in heat transfer relation with the bottom of the chip be provided in the opening of the fluid block component.

What is manifestly absent from the '408 patent is any suggestion or motivation to provide structure exterior to the reservoir housing side walls for cooling the fluid block 50. There is also no suggestion or motivation in the '408 patent for the fluid block component to be configured to provide a wall surface having fins. It is not clear from the '408 patent how this reference would be modified to include an external cooling fin in heat transfer relation with the chip and fluid block component which are clearly intended by the '408 patent to be completely enclosed in the ink reservoir housing by the closure and frame component. (1)

Furthermore, the teachings of U.S. Patent No. 5,084,713, filed after the filing dates of the '408 patent, the '964 patent and the '421 patent and applied in the rejection of Claims 25-28 and 31, states in column 1, lines 47-50 that "... attachment of a metal heat sink unit (e.g. a manifold) adjacent the resistor assembly..." has proven to be impractical from a technical and economic standpoint. The '713 patent clearly teaches (2)

away from the use of a heat sink element as described in the '408 patent and this teaching cannot be ignored.¹

When determining whether or not a reference suggests the claimed invention, the reference should be considered as a whole. Portions of the reference which argue against or teach away from the claimed invention must also be considered. Bausch & Lomb, Inc. V. Barnes-Hind/Hydrocurve, Inc., 796 F.2d 443, 230 USPQ 416, 420 (Fed. Cir. 1986).

The '408 patent also does not suggest ink feed slots be provided in the substrate locator wells of the substrate holder and a chamber on the opposing side of the substrate holder from the locator wells. The '408 patent suggests holes, not slots be provided in the fluid block component. There is nothing in the '408 patent with regard to the chambers on the opposing side of the substrate holder from the wells. The chambers are defined in Appellants' specification on page 8, lines 4-7 as having end walls and side walls or partition walls. The tube 11 extending from the back side of the fluid block in the '408 patent does not suggests Appellants' chambers. (u)

Recognizing the deficiencies of the '408 patent to suggest Appellants' invention, the Examiner cites the '964 patent to Fukuda et al. and the '421 patent to Hara et al. in combination with the '408 patent. The background of the '408 patent sets forth two distinct categories of bubble jet devices, i.e., those ejecting drops in a direction generally parallel to the surfaces of the heater elements and those ejecting ink droplets generally normal to the heater element surfaces. The '408 patent is said to be directed to bubble jet devices which eject ink generally normal to the heater element surfaces. (See column 1, lines 14-23 of the '408 patent). However, both of the '964 patent and the '421 patent are directed to bubble jet devices which eject ink drops in a direction generally (u)

¹The '713 patent is cited at this point in the discussion to evidence the state of the art as of the filing date of the application.

parallel to the heater element surfaces. (See Fig. 3 of the '964 patent and Fig. 44 of the '421 patent). There is nothing in any of the cited references to suggest that selected features of each of the different types of bubble jet devices be combined to provide the claimed invention. (5)

The '964 patent to Fukuda et al. requires that the printhead have a liquid-path formed by the heat-capacity member to promote heat exchange. (See column 4, lines 4-6 and column 5, lines 4-17 of the '964 patent.) The requirement of a liquid path in the heat-exchange member is substantially different than simply using a heat sink as described in the '408 patent since the '964 patent requires both liquid circulation in contact with the heat-capacity member and contact between the chip and the heat-capacity member and not simply contact between the chip and a heat sink as set forth in the '408 patent. The '964 patent thus solves a similar problem in a different way than the '408 patent and thus cannot properly be said to be combinable with other components of the '408 patent to provide the claimed invention. The two solutions are mutually exclusive and thus would not provide a substrate holder having cooling fins on a side wall thereof, an ink well and a chamber opposite the ink well. (6)

Furthermore, it is Appellants' position that the '964 patent does not direct one to modify the fluid block component of the '408 patent to provide cooling fins which extend outside of the ink reservoir body. Accordingly, no motivation to combine the '964 patent with the '408 patent to provide Appellants' invention has been shown. (7)

Likewise, the '421 patent is not properly combined with the '408 and '964 patents. The '421 patent, like the '964 patent only relates to printheads having drop ejection parallel to the surface to which the chip is attached. Accordingly, there is nothing in the '421 patent which would suggest this reference be combined with the '408 patent to provide Appellants' claimed invention. Furthermore, unlike the '408 patent and the '964 patent, the '421 patent requires a heat sink whereby temperature is controlled within (8)

a specified limit by use of a Peltier² cooler, heat discharging fin and fan. (See column 35, lines 58-62 of the '421 patent). It is improper to select only the heat sink from the '421 patent to combine with the '964 and '408 patents when the '421 patent calls for the use of the heat sink only in combination with the Peltier cooler and fan. Furthermore, the '421 patent fails to direct one skilled in the art how to modify the '408 patent to include a heat sink containing fins. Like the '964 patent, the '421 patent solves a similar problem in a different way than either the '408 patent or the '964 patent.

It is improper to dissect the references to extract portions of the teachings with regard to cooling the chip while ignoring the teachings of the references as a whole with regard to the aspects being combined. There simply is nothing in the references to suggest the combination made by the Examiner and for this reason alone, all of the rejections applying the combination of the '408, '964 and '421 patents are improper and should be reversed.

It is clear that there must be more than simply itemizing selected elements in the prior art and combining the elements to provide Appellants' invention. As the court stated in Environmental Designs, Ltd. v. Union Oil Co., 713 F.2d 693, 698, 218 USPQ 865, 870 (Fed. Cir. 1983), "... virtually all [inventions] are combinations of old elements." Identification of the elements in the prior art is not sufficient, however, to negate patentability, otherwise few patents would ever issue.

²A Peltier device, also known as thermoelectric (TE) modules, are small solid-state devices that function as heat pumps. A "typical" unit is a few millimeters thick by a few millimeters to a few centimeters square. It is a sandwich formed by two ceramic plates with an array of small Bismuth Telluride cubes ("couples") in between. When a DC current is applied heat is moved from one side of the device to the other - where it must be removed with a heatsink. The "cold" side is commonly used to cool an electronic device such as a microprocessor or a photodetector. If the current is reversed the device makes an excellent heater.

"To prevent the use of hindsight based on the invention to defeat patentability of the invention, this court requires the examiner to show a motivation to combine the references that create the case of obviousness. In other words, the examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed." In re Rouffet, 47 USPQ2d 1453, 1457, 1458 (Fed. Cir. 1998). The "... suggestion to combine requirement stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness." In re Rouffet, Ibid. at 1458.

In all of the rejections, the examiner has failed to show motivation to combine the references in the manner they are combined.

"To draw on hindsight knowledge of the patented invention, when the prior art does not contain or suggest that knowledge, is to use the invention as a template for its own reconstruction -- an illogical and inappropriate process by which to determine patentability. *W.L. Gore & Assoc. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983). The invention must be viewed not after the blueprint has been drawn by the inventor, but as it would have been perceived in the state of the art that existed at the time the invention was made. *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1138, 227 USPQ 543, 547 (Fed. Cir. 1985)." *Sensonics Inc. v. Aerosonic Corp.*, 38 USPQ2d 1551, 1554 (Fed. Cir. 1996).

When the references are in the same field as that of Appellants' invention, the test for selecting specific teachings to combine, "... must still be met by identification of some suggestion, teaching, or motivation in the prior art, arising from what the prior art would have taught a person of ordinary skill in the field of the invention." Furthermore, evidence that supports, rather than negates patentability must also be considered. In re Dance, 48 USPQ2d 1635, 1637, 1638 (Fed. Cir. 1998).

Even if the references were found to be properly combined, it is not clear how the combination would provide Appellants' invention. The '964 patent requires a

liquid flow path in the heat capacity member, whereas the '421 patent requires a combination of a Peltier cooler, heat discharge fin and fan to cool a separate aluminum plate attached to the chip. Hence the combination would require a Peltier cooler, fin, cooling fan and liquid flow path in the heat-capacity member. Appellants' provide cooling by making the entire substrate holder out of a heat-conducting member containing fins. Accordingly, a Peltier cooler, fan and liquid flow path in the heat capacity member are not required as set forth in the combined references. (a)

It is also submitted that the references, alone or in combination, fail to teach or suggest a chamber on the opposing side of the carrier from the locator wells. This element combined with the other elements of the invention is not found in the cited references. Accordingly, the rejection of Claims 1-5 and 10-12 should be reversed.

B. Claims 6-7 are Patentably Distinguished Over the Cited References.

Claims 6-7 depend from Claim 1 and are patentable over the cited references for the same reasons Claims 1-5 and 10-12 are patentable over the '408, '964 and '421 references. Claims 6-7 are directed to a substrate holder containing a coating or layer of poly(xylylene) thereon.

The '458 patent to Wenzel et al. is combined with the foregoing references and is cited only for use of a poly(xylylene) coating. The '458 patent does not cure the deficiencies of the other references to provide Appellants' claimed invention because the '458 patent does not suggest or describe the claimed elements set forth in detail above. The '458 patent is directed to use of a poly-p-xylylene coating on a nozzle plate rather than on a substrate holder. Also, the '458 patent fails to suggest or describe a substrate holder containing locator wells on one side thereof, ink feed slots in the wells, a chamber on the opposing side thereof and one or more side walls containing cooling fins. The rejection of Claims 6-7 is improper and should be reversed for all of the foregoing reasons.

C. Claim 8 is Patentably Distinguished from the Cited References.

Claim 8 depends from Claim 1 and is patentable over the cited references for the same reasons Claims 1-5 and 10-12 are patentable over the '408, '964 and '421 references. Claim 8 is directed to a substrate holder made of a material containing a high content of carbon fibers or graphite.

The '189 patent to Drake et al. is combined with the foregoing references and is cited only for use of a heat sink made of graphite. In particular, the '189 patent is directed to providing subunits for full width RIS or ROS arrays and is not specifically directed to ink jet printheads. There is nothing in the '189 patent with regard to a substrate holder having wells, with ink feed slots in the wells and chambers on an opposing side of holder from the well. There is also nothing in the '189 patent with regard to the substrate holder having one or more side walls containing cooling fins. Hence, the '189 patent does not cure the deficiencies of the other references to provide Appellants' claimed invention. It is therefore requested that the rejection of Claim 8 be reversed for all of the foregoing reasons.

D. Claim 9 is Patentably Distinguished from the Cited References.

Claim 9 depends from Claim 1 and is patentable over the cited references for the same reasons Claims 1-5 and 10-12 are patentable over the '408, '964 and '421 references. Claim 9 is directed to a substrate holder made of a metal-ceramic composite material.

The '689 patent to Cook is combined with the foregoing references and is cited only for use of a composite matrix material used as a package for housing an electrical device. It is said in the '689 patent that the composite structure can be used as a heat sink. However, there is nothing in the '689 patent with regard to ink jet printers and no suggestion to use the composite material as a heat sink material in an ink jet printer. Nevertheless, even if the '689 patent were found to suggest using a composite material as

a heat sink, the '689 patent does not cure the deficiencies of the other references to provide Appellants' claimed invention. The '689 patent does not suggest or describe the substrate holder having locator wells, ink feed slots in the locator wells, a chamber on the opposing side of the holder from the wells and one or more side walls containing cooling fins. The rejection of Claim 9 is in error and should be reversed for all of the foregoing reasons.

E. Claim 13 is Patentably Distinguished from the Cited References.

Claim 13 depend from Claim 1 and are patentable over the cited references for the same reasons Claims 1-5 and 10-12 are patentable over the '408, '964 and '421 references. Claim 13 is directed to carriage positioning devices on the side walls of the substrate holder.

The '836 patent to Ta et al. is combined with the foregoing references and is cited only for use of a alignment devices. According to the '836 patent, the alignment features or registration means are "provided on the front 22 of the cartridge and on the inside of the face plate 16." (See column 4, lines 60-63 of the '836 patent). This does not suggest that carriage positioning devices be adjacent one of the side walls of the substrate holder as called for in Claim 13 and Fig. 3A of the specification. The '836 patent also does not suggest or disclose a substrate holder having wells, ink feed slots in the wells, a chamber on the opposite side from the wells and one or more side walls containing cooling fins. Accordingly, the '836 patent fails to cure the deficiencies of the other references to provide Appellants' claimed invention. The rejection of Claim 13 is improper and should be reversed.

F. Claims 14-18 are Patentably Distinguished from the Cited References.

Claims 14-18 are directed to a method for making a print cartridge including casting or molding a substrate carrier from a material selected from carbon

fibers, graphite, metal-ceramic materials and metals. The substrate carrier includes a top surface containing one or more substrate locator wells, at least one ink feed slot in each well base, one or more chambers on the opposite side of the top surface, one or more side walls containing fins for heat removal and at least two alignment devices adjacent one of the side walls. An ink reservoir body is provided and attached to the substrate carrier. The print cartridge structure of the method is patentable over the cited references for the same reasons Claims 1-5 and 10-12 are patentable over the '408, '964 and '421 references.

The '836 patent to Ta et al. and the '584 patent to Keefe et al are combined with the foregoing references and are cited only for use of a alignment devices and a TAB circuit. Reference is made to the deficiencies of the '836 patent discussed above with regard to the rejection of Claim 13. This discussion is incorporated herein by reference thereto. The TAB circuit is no longer an element of Claims 14-18 and thus the '584 patent is not properly combined with the other references for this element.

The '584 patent does not describe a separate substrate carrier made of a molded or cast material which is attached to a separate ink reservoir body. In fact, the ink reservoir and printhead of the '584 patent are a unitary construction which does not suggest the attaching step of Claim 14. Also, the '584 patent does not suggest one or more side walls of a substrate carrier which contain cooling fins and a chamber on the opposite side of the substrate carrier from the wells. Thus, the '836 and '584 patents do not cure the deficiencies of the other references to provide Appellants' claimed invention. The rejection of Claims 14-18 is in error and should be reversed.

G. Claims 19-20 are Patentably Distinguished from the Cited References.

Claims 19-20 depend from Claim 14 and are patentable over the cited references for the same reasons Claims 14-18 are patentable over the '408, '964, '421, '836 and '584 references. Claims 19-20 are directed to coating a substrate carrier with a layer of poly(xylylene).

The '458 patent to Wenzel et al. is combined with the foregoing references and is cited only for use of a poly(xylylene) coating. The '458 patent does not cure the deficiencies of the other references to provide Appellants' claimed invention. As set forth above, the '458 patent is directed to use of a poly-p-xylylene coating on a nozzle plate rather than on a substrate holder. Also, the '458 patent fails to suggest or describe a substrate holder containing locator wells on one side thereof, ink feed slots in the wells, a chamber on the opposing side thereof and one or more side walls containing cooling fins. The rejection of Claims 19-20 is improper for all of the foregoing reasons and should be reversed.

H. Claim 21 is Patentably Distinguished from the Cited References.

Claim 21 depends from Claim 14 and is patentable over the cited references for the same reasons Claims 14-18 are patentable over the '408, '964, '421, '836 and '584 references. Claim 21 is directed to making a substrate carrier from carbon fibers or graphite.

The '189 patent to Drake et al. is combined with the foregoing references and is cited only for use of a heat sink made of graphite. The '189 patent does not cure the deficiencies of the other references to provide Appellants' claimed invention. As described above, the '189 patent is directed to providing subunits for full width RIS or ROS arrays and is not specifically directed to ink jet printheads. There is nothing in the '189 patent with regard to a substrate holder having wells, with ink feed slots in the wells and chambers on an opposing side of holder from the well. There is also nothing in the '189 patent with regard to the substrate holder having one or more side walls containing cooling fins. The rejection of Claim 21 is improper and should be reversed.

I. Claim 22 is Patentably Distinguished from the Cited References.

Claim 22 depends from Claim 14 and is patentable over the cited references for the same reasons Claims 14-18 are patentable over the '408, '964, '421, '836 and '584 references. Claim 22 is directed to making the substrate carrier from a metal-ceramic composite material.

The '689 patent to Cook is combined with the foregoing references and is cited only for use of a composite matrix material used as a package for housing an electrical device. As set forth above, there is nothing in the '689 patent with regard to ink jet printers and no suggestion to use the composite material as a heat sink material in an ink jet printer. Nevertheless, even if the '689 patent were found to suggest using a composite material as a heat sink, the '689 patent does not cure the deficiencies of the other references to provide Appellants' claimed invention. The '689 patent does not suggest or describe the substrate holder having locator wells, ink feed slots in the locator wells, a chamber on the opposing side of the holder from the wells and one or more side walls containing cooling fins. Because the '689 patent is improperly combined with and does not cure the deficiencies of the other references to provide Appellants' invention, the rejection of Claim 22 should be reversed.

J. Claims 25-28 and 31 are Patentably Distinguished from the Cited References.

Claims 25-28 and 31 are directed to a metal nose piece structure having a top surface containing substrate locator wells, at least one ink feed slot in each well base and one or more chambers on an opposing side from the nose piece from the wells. One or more of the side walls of the nose piece which are attached to the top surface along the perimeter thereof contain fins for heat removal. Slots are provided along the perimeter of the side walls for attaching the nose piece to an ink reservoir. At least two alignment devices are provided adjacent one of the side walls.

Claims 25-28 and 31 are patentable over the '408, '964 and '421 patents for the same reasons Claims 1-5 and 10-12 are patentable over these references. Likewise, Claims 25-28 and 31 are patentable over the '836 patent for the same reasons Claim 13 is patentable over the '836 patent. As set forth above, the '836 patent is directed to alignment features or registration means which are "provided on the front 22 of the cartridge and on the inside of the face plate 16." (See column 4, lines 60-63 of the '836 patent). This does not suggest that carriage positioning devices be adjacent one of the side walls of the nose piece as called for in Claim 25 and Fig. 3A of the specification.

The '713 patent to Wong is directed to a thermal ink jet system having an "... internal subsystem designed to cool the resistor assembly...." (See column 1, lines 65-68 of the '713 patent). According to the '713 patent, the support panel is modified to include a channel for ink flow and cooling of the substrate. (See column 2, lines 24-32 of the '713 patent). The '713 patent does not cure the deficiencies of the other references to provide Appellants' claimed invention because the '713 patent does not suggest or describe cooling fins on a side wall of the nose piece, an ink feed slot in the well base of the nose piece and a chamber on the opposite side of the nose piece from the locator wells. As seen in Fig. 8 of the '713 patent, the channel 102 is on the same side of the support panel 50 as the substrate 12.

Furthermore, as set forth above, the '713 patent leads away from the combination of references. The '713 patent states in column 1, lines 47-50 that ".... attachment of a metal heat sink unit (e.g. a manifold) adjacent the resistor assembly..." has proven to be impractical from a technical and economic standpoint. It is clear that the '713 patent leads away from use of a heat sink as called for in the 408 patent to Braun. Accordingly, the combination of references is improper and fails to provide all of the features and elements of Appellants' claimed invention. The rejection of Claims 25-28 and 31 should be reversed.

K. Claims 29-30 are Patentably Distinguished from the Cited References.

Claims 29-30 depend from Claim 25 and are patentable over the cited references for the same reasons Claims 25-28 and 31 are patentable over the '408, '964, '421 and '836 patents. Claims 29-30 are directed to a nose piece containing a coating or layer of poly(xylylene) thereon.

The '458 patent to Wenzel et al. is combined with the foregoing references and is cited only for use of a poly(xylylene) coating. The '458 patent does not cure the deficiencies of the other references to provide Appellants' claimed invention. The '458 patent is directed to use of a poly-p-xylylene coating on a nozzle plate rather than on a metal nose piece. Also, the '458 patent fails to suggest or describe a metal nose piece containing locator wells on one side thereof, ink feed slots in the wells, a chamber on the opposing side thereof and one or more side walls containing cooling fins. Thus the obviousness rejection of Claims 29-30 is improper and should be reversed.

L. Claims 32-35 and 38-39 are Patentably Distinguished from the Cited References.

Claims 32-35 and 38-39 are directed to a metal substrate carrier for an ink jet printer having a substantially planar substrate surface and four sides perpendicular to the substrate surface. The substrate surface contains locator wells and ink feed slots and chambers on an opposing side from the wells. At least one of the four sides has a substantially planar surface which is devoid of fins for containing contact pads for electrical connection to a printer. At least two of the four sides contain cooling fins. Claims 38-39 are directed to the carrier further including an ink reservoir body which is removably attached to the carrier.

Claims 32-35 and 38-39 are patentable over the '408, '964 and '421 patents for the same reasons Claims 1-5 and 10-12 are patentable over these references. Likewise, Claims 32-35 and 38-39 are patentable over the '584 patent for the same reasons Claim 22 is patentable over the '584 patent. The '584 patent to Keefe et al. is

combined with the foregoing references and is cited only for use of a TAB circuit. The '584 patent does not cure the deficiencies of the other references to provide Appellants' claimed invention. The TAB circuit is no longer an element of Claims 32-39 and thus the '584 patent is not properly combined with the other references for this element.

The '584 patent does not describe a separate substrate carrier made of a molded or cast metal which is removably attached to a separate ink reservoir body. In fact, the ink reservoir and printhead of the '584 patent are a unitary construction. Also, the '584 patent does not suggest at least two of the four sides of a substrate carrier containing cooling fins and a chamber on the opposite side of the substrate carrier from the wells. Thus, the '584 patent does not cure the deficiencies of the other references to provide Appellants' claimed invention. The rejection of Claims 32-35 and 38-39 is in error and should be reversed.

M. Claims 36-37 are Patentably Distinguished from the Cited References.

Claims 36-37 depend from Claim 33 and are patentable over the cited references for the same reasons Claims 32-35 and 38-39 are patentable over the '408, '964, '421 and '584 patents. Claims 36-37 are directed to a carrier containing a coating or layer of poly(xylylene) thereon.


The '458 patent to Wenzel et al. is combined with the foregoing references and is cited only for use of a poly(xylylene) coating. The '458 patent does not cure the deficiencies of the other references to provide Appellants' claimed invention. The '458 patent is directed to use of a poly-p-xylylene coating on a nozzle plate rather than on a metal substrate carrier. Also, the '458 patent fails to suggest or describe a substrate carrier containing locator wells on one side thereof, ink feed slots in the wells, a chamber on the opposing side thereof and one or more side walls containing cooling fins. Thus the obviousness rejection of Claims 36-37 is improper and should be reversed.

In conclusion, it is submitted that the Examiner has engaged in impermissible hindsight reconstruction of the invention, by selectively choosing portions of the references and combining the portions of the references to provide the claimed invention without one scintilla of motivation from the references themselves to make the specific combination. Furthermore, even if the references were combined as suggested by the Examiner, the combined references fail to provide all of the features and elements of the claimed invention. It is therefore requested that the rejections of Claims 1-22 and 25-39 be reversed and the case passed to allowance.

Respectfully submitted,

LUEDEKA, NEELY & GRAHAM, P.C.

By:

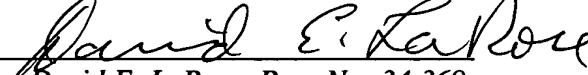

David E. LaRose
Registration No. 34,369
Attorney for Appellants

January 3, 2001
P.O. Box 1871
Knoxville, Tennessee 37901
(865) 546-4305

* * * CERTIFICATE OF MAILING * * *

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David E. LaRose, Reg. No. 34,369

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APPENDIX

Claims on Appeal

1. An ink jet print cartridge structure comprising a substrate holder for mounting thereon one or more semiconductor substrates, the substrate holder having a top surface having a perimeter and containing one or more substrate locator wells, each well having a plurality of well walls and a well base, each well base including at least one ink feed slot therein, the holder including one or more chambers on an opposing side of the substrate holder from the locator wells, each chamber being in flow communication with a corresponding substrate locator well, the holder also containing side walls attached to the top surface along the perimeter thereof, wherein one or more of the side walls contain fins for convectively removing heat from the substrate holder.

2. The structure of Claim 1 wherein the substrate holder comprises a cast, molded or machined metal selected from the group consisting of aluminum, beryllium copper, gold, silver, zinc, tungsten and alloys of two or more of the foregoing.

3. The structure of Claim 1 wherein the substrate holder is comprised substantially of aluminum or zinc.

4. The structure of Claim 1 further comprising a coating or layer of silicon dioxide thereon.

5. The structure of Claim 4 wherein the coating or layer of silicon dioxide has a thickness ranging from about 0.1 to about 2.5 microns.

6. The structure of Claim 1 further comprising a coating or layer of poly(xylylene) thereon.

7. The structure of Claim 6 wherein the coating or layer of poly(xylylene) has a thickness ranging from about 0.1 to about 10 microns.

8. The structure of Claim 1 wherein the substrate holder is made of a material containing a high content of carbon fibers or graphite.

9. The structure of Claim 1 wherein the substrate holder is made of a metal-ceramic composite.

10. The structure of Claim 1 further comprising an ink reservoir or ink container body.

11. The structure of Claim 10 wherein the ink reservoir body is attached to the substrate holder.

12. The structure of Claim 10 wherein the ink reservoir body is formed integral with the substrate holder.

13. The structure of Claim 1 further comprising one or more carriage positioning devices adjacent one of the side walls of the substrate holder.

14. A method for making a print cartridge structure containing an ink reservoir body for a multi-color thermal ink jet printer which comprises casting or molding a multi-function substrate carrier from a material selected from the group consisting of carbon fibers, graphite, metal-ceramic materials and metals, the substrate

carrier having a top surface having a perimeter and containing one or more substrate locator wells each well having well walls, a well base and at least one ink feed slot in each well base, the carrier including one or more chambers on an opposing side of the substrate carrier from the locator wells, each chamber being in flow communication with a corresponding substrate locator well, side walls attached to the top surface along the perimeter thereof wherein one or more of the side walls contain fins for heat removal from the substrate carrier and at least two alignment devices adjacent one of the side walls for precisely attaching the substrate carrier and reservoir body to a printer carriage, providing an ink reservoir body and attaching the ink reservoir body to the substrate carrier.

15. The method of Claim 14 wherein carrier is a cast, molded or machined metal selected from the group consisting of aluminum, beryllium copper, gold, silver, zinc, tungsten and alloys of two or more of the foregoing.

16. The method of Claim 14 wherein the carrier is substantially made of aluminum or zinc.

17. The method of Claim 14 further comprising coating the carrier with a layer of silicon dioxide.

18. The method of Claim 17 wherein the silicon dioxide coating has a thickness ranging from about 0.1 to about 2.5 microns.

19. The method of Claim 14 further comprising coating the carrier with a layer of poly(xylylene).

20. The method of Claim 19 wherein the coating of poly(xylylene) has a thickness ranging from about 0.1 to about 10 microns.

21. The method of Claim 14 wherein the carrier is made of a material containing a high content of carbon fibers or graphite.

22. The method of Claim 14 wherein the carrier is made of a metal-ceramic composite.

25. A nose piece for an ink jet printer cartridge, the nose piece comprising a machined, molded or cast, substantially metal structure having a top surface having a perimeter and containing one or more substrate locator wells each well having well walls, a well base and at least one ink feed slot in each well base, the nose piece including one or more chambers on an opposing side of the nose piece from the locator wells, each chamber being in flow communication with a corresponding locator well, side walls attached to the top surface along the perimeter thereof wherein one or more of the side walls contain fins for heat removal from the nose piece, a plurality of slots along the perimeter of the side walls for precisely attaching the nose piece to an ink reservoir body and at least two alignment devices adjacent one of the side walls for precisely aligning the nose piece and reservoir body to a printer carriage, wherein the metal is selected from the

group consisting of aluminum, beryllium, copper, gold, silver, zinc tungsten and alloys of two or more of the foregoing.

26. The nose piece of Claim 25 wherein the metal comprises aluminum or zinc.

27. The nose piece of Claim 25 further comprising a coating or layer of silicon dioxide thereon.

28. The nose piece of Claim 27 wherein the coating or layer of silicon dioxide has a thickness ranging from about 0.1 to about 2.5 microns.

29. The nose piece of Claim 25 further comprising a coating or layer of poly(xylylene) thereon.

30. The nose piece of Claim 29 wherein the coating or layer of poly(xylylene) has a thickness ranging from about 0.1 to about 10 microns.

31. The nose piece of Claim 25 further comprising an ink reservoir body attached to the nose using the slots along the perimeter of the side walls of the carrier.

32. A substrate carrier for an ink jet printer comprising a molded or cast metal body containing a substantially planar substrate surface and four sides essentially perpendicular to the substrate surface, the substrate surface including one or more substrate locator wells each having a well base for attaching thereto one or more semiconductor substrates, at least one ink feed slot in the base of the well for flow of ink from an ink reservoir attached to the body of the carrier through a cylindrical ink feed

chamber in the body to the ink feed slot, the ink feed chamber being disposed on an opposing side of the substrate carrier from the substrate locator well, wherein at least one of the four sides has a substantially planar surface devoid of fins extending from the substrate surface essentially perpendicular thereto for containing contact pads for electrical contact form a printer to the substrates on the body, and at least two of the four sides contain cooling fins.

33. The carrier of Claim 32 wherein the metal comprises aluminum or zinc.

34. The carrier of Claim 33 further comprising a coating or layer of silicon dioxide thereon.

35. The carrier of Claim 34 wherein the coating or layer of silicon dioxide has a thickness ranging from about 0.1 to about 2.5 microns.

36. The carrier of Claim 33 further comprising a coating or layer of poly(xylylene) thereon.

37. The carrier of Claim 36 wherein the coating or layer of poly(xylylene) has a thickness ranging from about 0.1 to about 10 microns.

38. The carrier of Claim 32 further comprising an ink reservoir body removably attached to the carrier for flow of ink through the ink chamber to a semiconductor substrate attached to the well base.

39. The carrier of Claim 32 wherein the at least one side further comprises one or more notches for removably attaching an ink reservoir to the carrier.

Art Unit: 2853


TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael S. Brooke whose telephone number is 703-305-0262. The examiner can normally be reached on 6:30-300 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Barlow can be reached on 308-3126. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3431 for regular communications and 703-305-3431 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Michael S. Brooke
October 2, 2000



DAVID F. YOCKEY
PRIMARY EXAMINER